

a state when the pressurization is stopped, are stored as initial curves characteristic of the vehicle; the judgment as to whether there is a leak in the fuel tank 1 can be made by comparing pressure transition when being pressurized with the fuel tank 1 closed by the jet pump 8, with the pressurization initial curve and, a judgment as to whether there is a leak in the canister 13 can be made while idling by comparing the depressurization initial curve with the depressurizing curve when the fuel purge system, including the canister 13, in the pressurized state is closed.

Further, this invention is not limited to the above-described embodiments, and the form may be freely changed within the bounds of the invention and free modification within the range of the spirit of the invention is possible.

What is claimed is:

1. An apparatus for detecting fuel-vapor gas leaks, comprising:
 - a valve for performing shut-off control of a vapor purge system that includes a canister that connects a fuel tank to an internal combustion engine;
 - an open/close controllable reference orifice having a reference leak hole, said reference orifice for causing leakage from the vapor purge system through the reference leak hole;
 - a jet pump for introducing outside air to the vapor purge system and for pressurizing the vapor purge system, by gasoline flow from a submerged fuel pump in the fuel tank;
 - an internal pressure sensor for measuring internal pressure of the vapor purge system; and

a storage device for storing as an initial curve, in a time series, pressure values taken by the internal pressure sensor in a state with the reference orifice alone opened and with pressurization from the jet pump carried out for a predetermined time period; wherein

by comparing a time series in a pressure curve obtained by the jet pump pressurizing the vapor purge system in a completely shut-off state over the predetermined time period, with the time series in the initial curve, when the pressure curve is lower than the initial curve, the device for detecting fuel-vapor gas leaks judges that a leak is present.

2. An apparatus for detecting fuel-vapor gas leaks as recited in claim 1, wherein judgment of no leakage and normal condition is performed, and the leak detection is terminated, at a point in time when the pressure curve from the start of leak detection exceeds the pressure values of the initial curve when the predetermined time period has elapsed.

3. An apparatus for detecting fuel-vapor gas leaks, comprising:
a valve for performing shut-off control of a vapor purge system that includes a canister that connects a fuel tank to an internal combustion engine;

an open/close controllable reference orifice having a reference leak hole, said reference orifice for causing leakage from the vapor purge system through the reference leak hole;

a jet pump for introducing outside air to the vapor purge system and for pressurizing the vapor purge system by gasoline flow from a submerged

fuel pump in the fuel tank;

an internal pressure sensor for detecting the internal pressure of the fuel tank;

a vent valve arranged between the fuel tank and the canister, for shutting off the fuel tank from the canister according to an external signal;

a control valve for open/close control of air flow to the canister and the jet pump; and

a storage device for storing pressure values, in an increasing pressure condition as an increasing pressure initial curve, during pressurization by the jet pump over a first predetermined time period with the vent valve closed and the reference orifice opened and for storing as a decreasing pressure initial curve, after halting the pressurization after the first predetermined time period has elapsed, pressure values under a decreasing pressure condition by means of leakage through the reference orifice, in a time series over a second predetermined time period; wherein

judgement of leak existence in the fuel tank side of the vapor purge system is performed by comparing a time series in an increasing pressure curve obtained by the jet pump pressurizing the fuel tank in a closed condition, with the time series in the increasing pressure initial curve; and

judgement of leak existence in the canister side of the vapor purge system is performed, when an actual pressure value exceeds the pressure value of the increasing pressure initial curve at the first predetermined time, by halting the pressurization and comparing a time series in a decreasing pressure curve with the purge system being completely shut-off, with the time series in the decreasing pressure initial curve.

4. An apparatus for detecting fuel-vapor gas leaks as recited in claim 3, wherein:

the vent valve, which is arranged between the fuel tank and the canister and enables shutting off the fuel tank from the canister according to a control signal, and the control valve, which performs open/close control of air flow from the canister to the jet pump, are provided as one unit in a vent valve device; and

the vent valve and the control valve are opened and closed contrariwise by the control signal.

5. An apparatus for detecting fuel-vapor gas leaks as recited in claim 1, further comprising a fuel level gauge in the fuel tank, wherein the pressure values are corrected from liquid surface information found by the fuel level gauge and judgment is made as to whether a leak is present.

6. An apparatus for detecting fuel-vapor gas leaks as recited in claim 3, further comprising a fuel level gauge in the fuel tank, wherein the pressure values are corrected from liquid surface information found by the fuel level gauge and judgment is made as to whether a leak is present.

7. A vent valve device in an apparatus for detecting fuel-vapor gas leaks, comprising:

a vent valve for shutting off a fuel tank from a canister by buoyancy of a float that rises with rising liquid surface level in the fuel tank;

a control valve body for moving, according to a control signal from outside, in a direction in which a control valve, which communicates with a jet pump, opens; and

a linking member that pulls the vent valve so as to shut it off when the control valve body moves in its opening direction, wherein

the linking member has an engagement structure for not letting the control valve body move in its opening direction with the float rising with the liquid surface.